

**DATA ON THE CHIRONOMUS FAUNA
OF THE FLOOD AREA
OF THE TISZA AT TISZAFÜRED—KISKÖRE**

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Abstract

The author is establishing on the basis of his investigations that in the area that is water-covered after the water-basin being constructed the *Chironomus* species characteristic of the stagnant waters have kept on surviving in masses at present, too. In this way, the development of the rich benthofauna of the lake is guaranteed. It can, however, be checked by the anaerobic decomposition of the vegetation that has remained in the flood area and got under water, by the formation of hydrogen sulphide in large quantities.

Introduction

It is well-known that the environmental changes react upon the quantity and species composition of the living beings. The Tisza region between Tiszafüred and Kisköre gets the character of a lake after the water barrage being constructed, and that changes its natural history, too.

It is important both from scientific and from practical points of view to know the present state because we are able, in this way, partly to study the process of development of the natural history of an artificial lake of such a large extent and partly to draw a conclusion concerning the predominating species and the factors determining the species composition of the natural history of the new lake. The practice expects an answer to the question, what quantity, and from commercial respect what quality, of fish can be assured by the new lake of 14,800 ha size, and how can be achieved in fish-catching an as favourable ratio as possible of "noble" fish opposite to "rubbish" fish.

In 1970 I began investigating the *Chironomus* species of the indicated areas taking into consideration the research tasks outlined.

Materials and Methods

As the inundation period had been prolonged long owing to the extraordinary weather, I could carry out my observations and collection in the indicated areas in the parts marked out of the grassland at Cserőköz, the meadow at Tizanána and the meadow at Sarud (Fig. 1) only between 21st and 23rd October.

I took mud-samples by means of Ekman's mud-gripper from the barrow pits in which there was water in the time of collecting, rewqshing them through a sieve set on the spot. I fixed the nymphs found in the samples in 80 per cent alcohol. From the vegetation of the collecting stations I have collected imagos by singling, and by applying a net, fixing these similarly in 80 p. c. alcohol.

Results, conclusions

In the course of elaborating the material collected, I have determined the following species:

Tanypodinae:

Ablabesmyia monilis L.

Chironominae:

Chironomus anthracinus Z.,

Chironomus aprilinus MG.,

Chironomus thummi K.,

Chironomus winthemi GOETGH.,

Endochironomus tendens F. (nymph)

Stictochironomus sp. (nymph)

Tanytarsus sp. (imago).

At elaborating the material collected it was immediately striking that the species enumerated (except *Stictochironomus* sp.) correspond to the species of the rice-fields, irrigation canals, drain-canals and back-waters investigated systematically for eight years in the vicinity of Szarvas (SZITÓ 1968). The species recorded on, similarly to those in the areas at Szarvas, are of predominating character as to the number of individuals, as well. I caught with net in the collecting area of the Tisza with the highest individual number the imagos of *Chironomus thummi* K. and *Ch. anthracinus* Z., both having large bodies.

It follows from the high number of individuals that the species mentioned are standing members of the fauna of smaller or larger back-waters, stagnant waters in the Tisza region investigated.

Owing to the high-degree similarity of the species of two areas lying so far from each other, we can say for certain that we shall find several species characteristic of standing waters by means of still more exhausting collections to be carried out in the area of the to-be reservoir in the summer months. The *Chironomus* species that will populate the lake to be constructed and the present flood area after being covered with water are, therefore, living in that area at present, too. Because of the slow filling in of the lake, in the first few years the shallow lake may mean very favourable conditions for the multiplication of the species to be found here. The living and deceased vegetation to the lake will be an abundant source of food for the mining and mud-dwelling nymphs.

As long as in this immense area, in the first years of damming up the lake, the water vegetation of the previous flood area grows above the water surface, these places will assure a favourable possibility for the multiplication of the various *Chironomus* species, and we may reckon with a very rich mud-fauna. On the other hand, as the depth of water grows in the course of damming, the vegetation rising above the water surface will be limited more and more to the riverside regions, and the occurrence of the *Chironomus* nymphs, too, can be expected in large numbers first of all in these places.

After restocking the lake, the consumption of the bottom fauna by fish will, of course, contribute to decrease their number. That will, however, not be a decisive factor in the decrease of nymph number; this factor will be the lack of being covered with vegetation.

The appraisal of the food supply of the zooplankton in the lake must precede the blueprint of fish-breeding in the water-basin. That is important first of all for the carp-breeding, so much the more because the subordinate part of the *Chironomidic* nymphs in the feeding of carp is confirmed by the most recent investigations (MEGYERI 1969).

On the other hand, the development and importance of the mud-fauna depends on the so-called redox-level. In May 1970, G. UHERKOVICH raised the question in his address delivered at the Conference of the Tisza research that the decomposition of the great quantity of organic matter getting under water-covering may bring about unfavourable conditions for the animal kingdom of the lake. On the basis of Berczik's investigations (1962), he is setting out the fact that in places where the hydrogen-sulphide (H_2S) level is on the surface of mud or above it the mud-dwelling nymphs of the *Chironomus* are missing: either they have perished owing to being poisoned or, feeling the danger of perdition, they have escaped into higher regions.

If in the new water-basin the hydrogen-sulphide (H_2S) level is over the mud surface owing to the large quantity of organic matter then — until its decrease and sinking under the mud surface — we cannot speak of a mud-fauna. As there will be an intensive fish-breeding in the lake, it is necessary to carry out thorough investigations from this point of view before the beginning of that.

Summary

From knowing the *Chironomus* fauna of the areas getting under water-covering we can conclude the species composition to be expected in the water-basin. As a result of the standing-water character of the lake, first of all the predominance of the backwater species, resp. that of those with wide ecological valancy is to be expected.

An intensive fish-breeding is only possible on the basis of the knowledge of the biochemical conditions subsisting in the lake.

References

- BERCZIK, Á. (1962): Kénhidrogén szint és a hazai eutróf tavak benthosának produkciója (Hydrogen-sulphide level and the production of benthos of the eutrophic lakes in this country). — *Allattani Közl.* 49, 35—39.
- FITTKAU, E. J. (1962): Die Tanyopodinae (Dipt.: Chironomidae). Die Tribus Anatopyniini, Macropelopiini u. Pentaneurini. — Berlin.
- LENZ, F. (1962): Tendipedidae-Tendipedinae. In: LINDER, E.: Die Fliegen der Palaearktischen Region (Lieferungen), 1—260.
- MEGYERI, J. (1969): A ponty természetes táplálékáról (About the natural food of the carp). — Yearb. of the Teachers' Training College, Szeged, 121—148.
- SZITÓ, A. (1968): Arvaszúnyoglárvaikon végzett megfigyelések és kísérletek. — Doktori értekezés (Observations and experiments carried out on the nymphs of *Chironomus*). — Doct. Diss. — Szeged.